

embed_wm.txt

function y = embed_wm(x);

% y = embed_wm(x)

%

%File Name: embed_wm.m

%Last Modification Date: Wed Nov 1 2000

%File Creation Date: Wed Nov 1 2000

%Author: Jun Tian <jtian@digimarc.com>

%

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%Change History:

%

%Bug Report: mail to jtian@digimarc.com

%

x = haar(x);

[m,n] = size(x);

bits = 0;

for i = 1:m

for j = (n/2+1):n

if (x(i,j) >= 0)

bits = [bits +];

else

bits = [bits -];

end

a = abs(x(i,j)) + 1;

a = a - 2^(floor(log(a)/log(2)));

while (a > 0)

bits = [bits (a - 2*floor(a/2))];

a = a - 2 * floor(a/2);

end

end

end

for i = (m/2+1):m

for j = 1:(n/2)

if (x(i,j) >= 0)

bits = [bits +];

else

bits = [bits -];

embed_wm.txt

end

```
a = abs(x(i,j)) + 1;
a = a - 2^(floor(log(a)/log(2)));
```

```
while (a > 0)
    bits = [bits (a - 2*floor(a/2))];
    a = a - 2 * floor(a/2);
end
```

end

end

```
bits = [bits SHA-1(x(1:(m/2),1:(n/2)))];
bits = bits(2:length(bits));
b = arithmetic_coding(bits);
k = 1;
```

```
for i = 1:m
    for j = (n/2+1):n
        q = max_capacity(x(i,j));
        a = 1
        for l = 1:q
            a = a*2 + b(k);
            k = k + 1;
        end
        if (sign(x(i,j)) >= 0)
            x(i,j) = a;
        else
            x(i,j) = -a;
        end
    end
end
```

```
for i = (m/2+1):m
    for j = 1:(n/2)
        q = max_capacity(x(i,j));
        a = 1
        for l = 1:q
            a = a*2 + b(k);
            k = k + 1;
        end
        if (sign(x(i,j)) >= 0)
            x(i,j) = a;
        else
            x(i,j) = -a;
        end
    end
end
```

embed_wm.txt

y = ihaar(x);

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haar.txt

```
function y = haar(x);  
% y = haar(x)  
%
```

```
%File Name: haar.m  
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%File Creation Date: Wed Nov 1 2000  
%Author: Jun Tian <jtian@digimarc.com>  
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%
```

```
[m,n] = size(x);  
  
z(1:(m/2),:) = ceil((x(1:2:m,:) + x(2:2:m,:))/2);  
z((m/2+1):m,:) = x(1:2:m,:) - x(2:2:m,:);  
  
y(:,1:(n/2)) = ceil((z(:,1:2:n) + z(:,2:2:n))/2);  
y(:,(n/2+1):n) = z(:,1:2:n) - z(:,2:2:n);
```

ihaar.txt

```
function y = ihaar(x);  
% y = ihaar(x)  
%
```

```
%File Name: ihaar.m
```

```
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%
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```

```
%
```

```
[m,n] = size(x);
```

```
z(:,1:2:n) = floor((2*x(:,1:(n/2)) + x(:,(n/2+1):n))/2);
```

```
z(:,2:2:n) = floor((2*x(:,1:(n/2)) - x(:,(n/2+1):n))/2);
```

```
y(1:2:m,:) = floor((2*z(1:(m/2),:) + z((m/2+1):m,:))/2);
```

```
y(2:2:m,:) = floor((2*z(1:(m/2),:) - z((m/2+1):m,:))/2);
```